Industry Canada Industrie Canada

Services in the Knowledge-based Economy

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Canada

Services and Innovation

The service sector is key to transforming Canada into a knowledge-based economy

- The service sector now accounts for more than two-thirds of GDP, up just over one percentage point since 1990.
- More than 11 million Canadians are employed in the sector, nearly three-quarters of total employment.

Share of Services in GDP*, 2000

Total GDP*: 786,838 Million

*GDP at factor cost, 1992 prices
Source: Compilations based on Statistics Canada Data

Share of Services in Employment, 2001

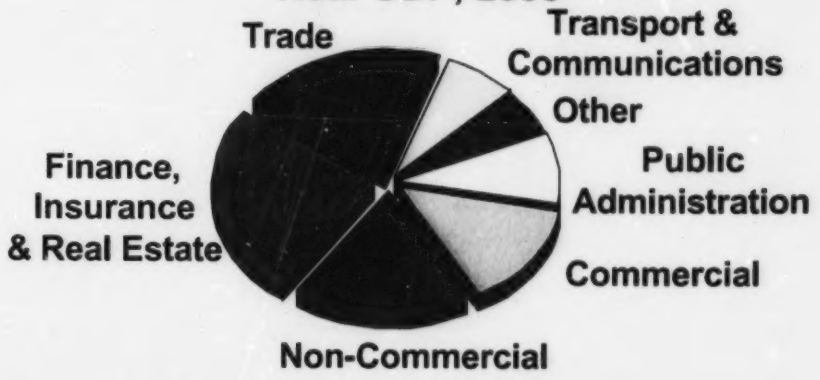
Total Employment: 15,076,700

Source: Compilations based on Statistics Canada Data

The sector is becoming more high end

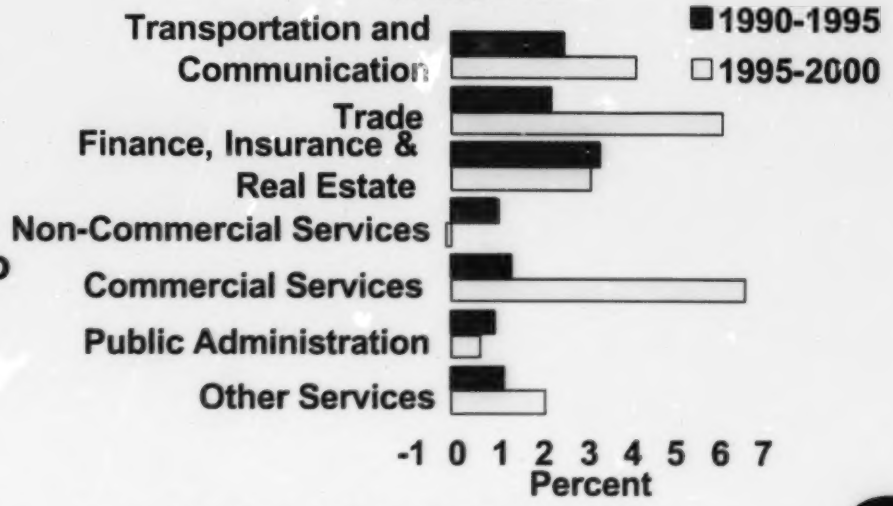
- Service industries encompass high-tech industries like computer services and many other ICTs.
- Producer, business and professional services, like management consulting, architectural and engineering services, legal and accounting are growing rapidly.
- The share of workers in the service sector with a university degree is 18%. This compares to 6% for manufacturing.

Distribution of Service Sector in Real GDP, 2000



Source: Compilations based on Statistics Canada Data

Average Annual Growth Rate of Service Industries



Source: Compilations based on Statistics Canada Data

The service sector is improving its productivity

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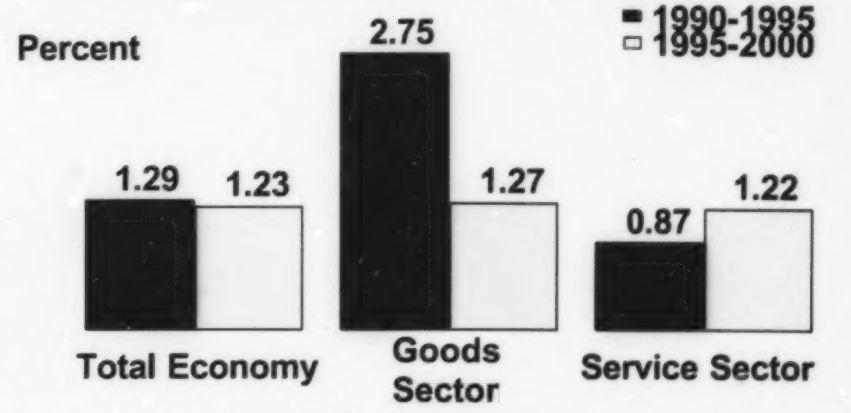
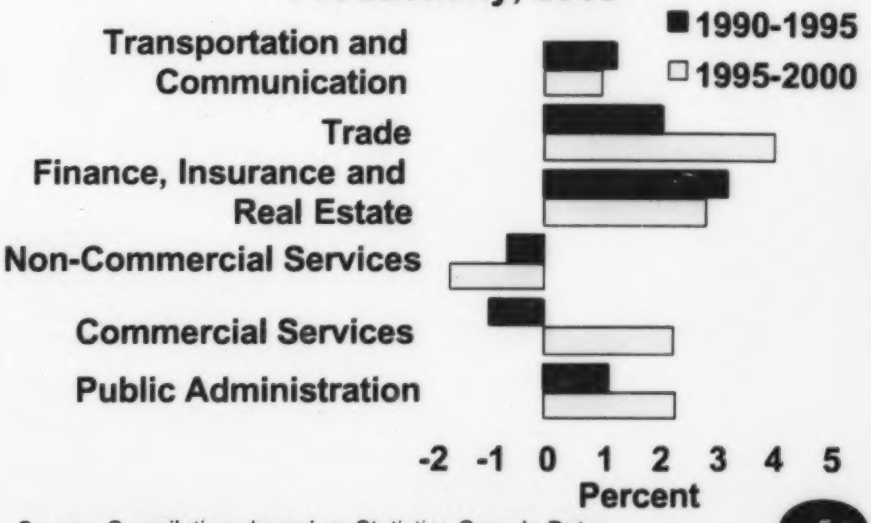
- The service sector has traditionally been found to have slower productivity growth than the goods sector.
- However, in the second half of the 1990s, the service sector saw a significant improvement in labour productivity growth that nearly matched that of the goods sector.
- Finance, insurance and real estate along with trade showed the highest productivity growth rates in the service sector throughout the 1990s.

Average Annual Growth In Labour Productivity



Source: Compilations based on Statistics Canada Data

Average Annual Growth in Labour Productivity, 2000

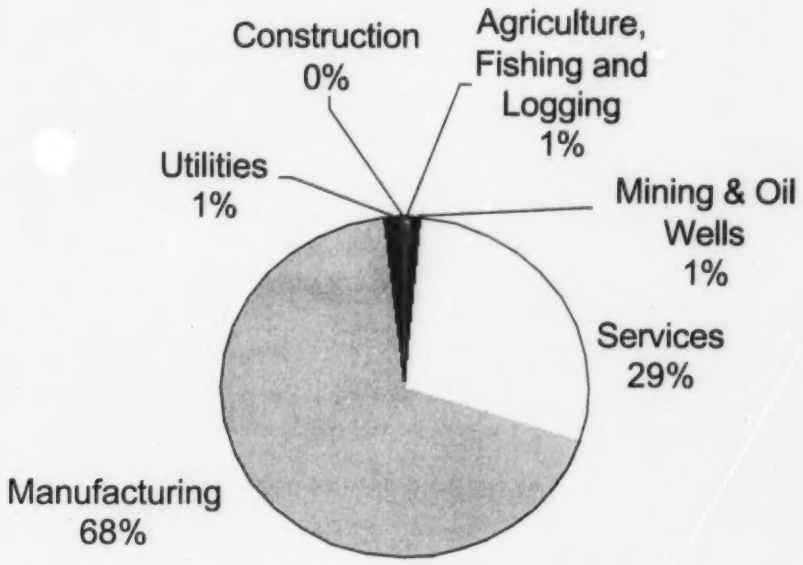


Source: Compilations based on Statistics Canada Data

Is the service sector investing in innovation?

- **According to traditional measures, services appear to be less innovative than manufacturing.**
- **The service sector accounted for only 29% of Canada's R&D in 2000.**
- **However, we are seeing evidence that services play an important role in Canada's innovation process. Knowledge-intensive services do contribute to the innovation process in manufacturing.**

Total Intramural R&D Expenditures
By Major Industry Grouping, 2001



Source: Statistics Canada. Industrial Research and Development: 2001 Intentions, Catalogue No. 88-202, Ottawa, 2001, Table 1

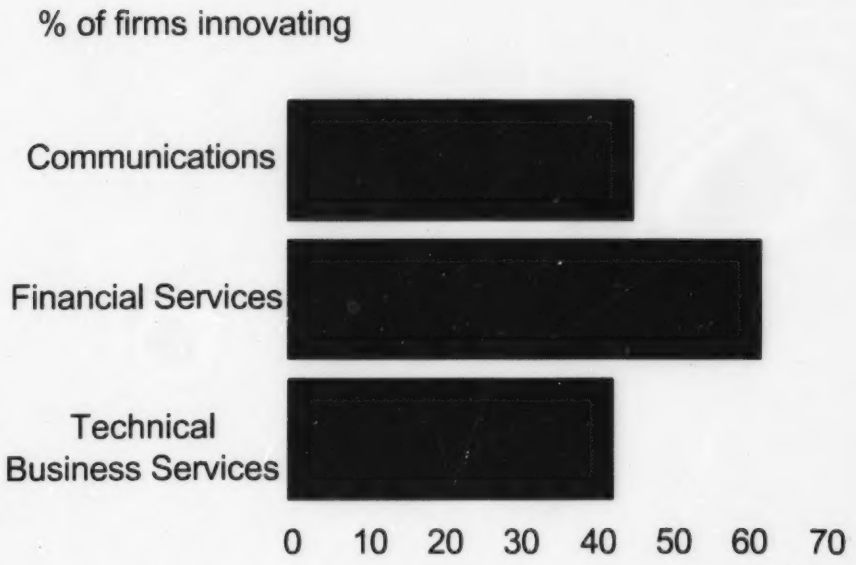
Some services clearly are innovative

- **Service industries have become major users, originators and diffusers of technology and non-technological innovations throughout the economy.**

- **For example, communications, financial services and technical business services (like computer services) are among the most innovative industries in Canada.**
  - **These service industries have innovation rates comparable to the most innovative manufacturing industries such as electronics and pharmaceuticals.**

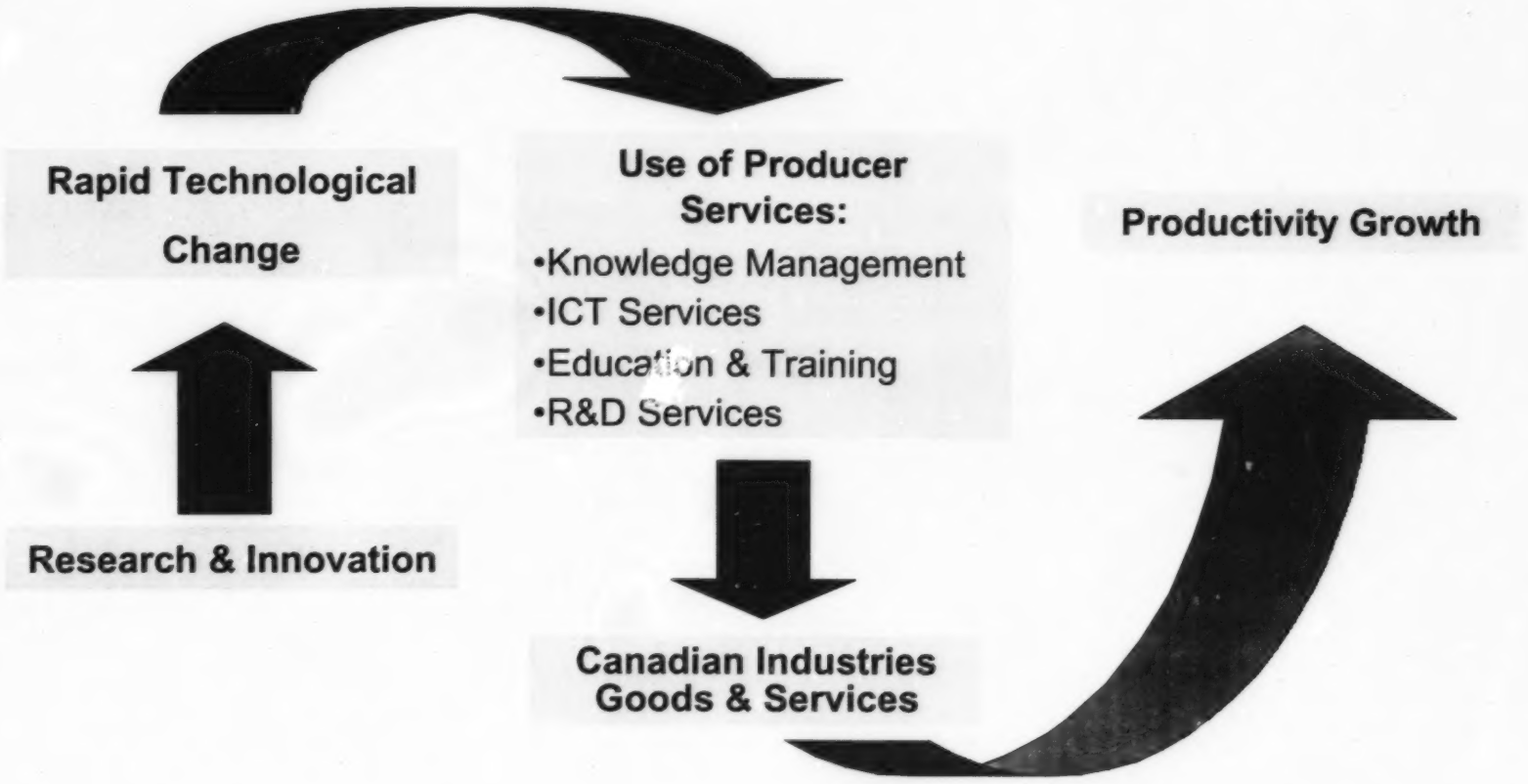
- **Innovation in these industries is widely felt and is an impetus for innovation and change in other sectors of the economy.**

Innovation Rates by Industry



Source: Statistics Canada, Innovation in Dynamic Service Industries, Catalogue no. 88-516-XPB, 1999

And, in ensuring the success of Canada's innovation agenda



Canada's Innovation Agenda

Canada's Innovation Performance

The process through which new economic and social benefits are extracted from knowledge
–OECD definition

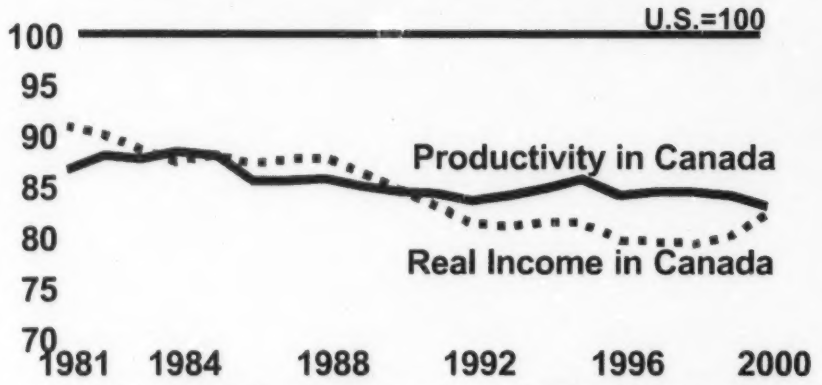
The Big Picture

- **Knowledge has become the key driver of economic performance.**
- **Canada will secure its competitive advantage in the global knowledge-based economy by maximizing its capacity to innovate.**
- **Canada's goal, as stated in the 2001 Speech from the Throne, is to be recognized as one of the most innovative countries in the world.**
- **We must improve Canada's innovation performance to ensure a high standard of living and quality of life.**
- **The private sector is at the centre of innovation.**
- **Governments and academia have a supportive role in three areas: knowledge performance, skills, and the innovation environment.**

Canada's Productivity Performance

- Our standard of living is high in relation to the rest of the world, but we have a gap compared to the U.S. due to our poor productivity performance.
- Productivity gap between Canada and the U.S. rose from about 14% in 1981 to its current level of 19%.
- Innovation is key to improving our productivity.

Standard of Living and Productivity*
Canada Relative to the U.S.



*Productivity is measured as real GDP per hour worked and real income is measured as real GDP per capita. Canadian values were converted to 2000 U$ using 2000 PPP
Sources: Statistics Canada and U.S. Bureau of Economic Analysis

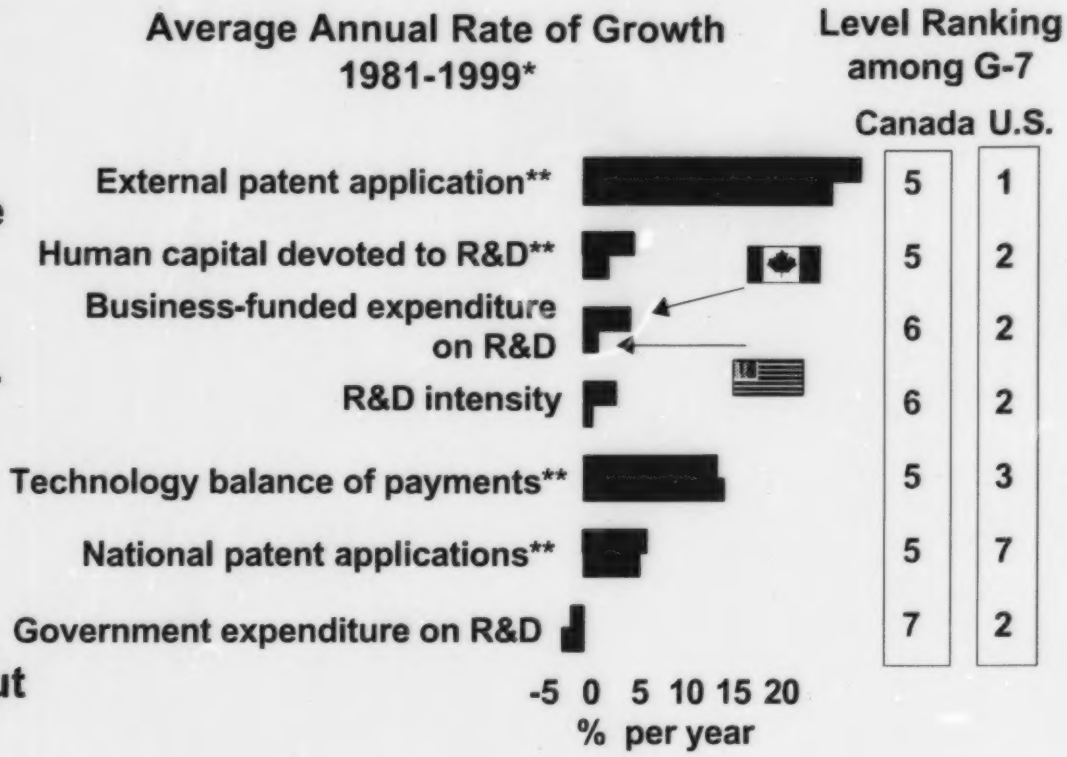
Productivity Levels

*Labour productivity for total economy is measured using GDP (in 2000 dollars) per hour
**Labour productivity for the manufacturing sector is measured by GDP per hour, based on the methodology of the Centre for the Study of Living Standards
Source: Statistics Canada, U.S. Bureau of Labor Statistics

Canada is progressing toward a more innovative economy

- **Business, academia and government have been investing in innovation and we are making significant gains.**
- **But Canada's innovation performance is still near the bottom in the G-7.**
- **Future prospects are bright. (Current competitiveness ranking is 11th; growth competitiveness ranking is 3rd.)**
- **We are on the right track, but we need to build on our strengths to realize our potential.**

Canada's Innovation Performance


Average Annual Rate of Growth 1981-1999*
Level Ranking among G-7
Canada U.S.
External patent application** 5 1
Human capital devoted to R&D** 5 2
Business-funded expenditure on R&D 6 2
R&D intensity 6 2
Technology balance of payments** 5 3
National patent applications** 5 7
Government expenditure on R&D 7 2
-5 0 5 10 15 20
% per year

*or latest year available
**Adjusted by the size of labour force
Source: OECD, Main Science and Technology Indicators, 2001/2

Canada's Innovation Challenges

- **Canada's innovation challenges exist in three broad areas:**
  - **→The Knowledge Performance Challenge**
  - **→The Skills Challenge**
  - **→The Innovation Environment Challenge**
- **A multi-pronged effort will be required to address these challenges.**

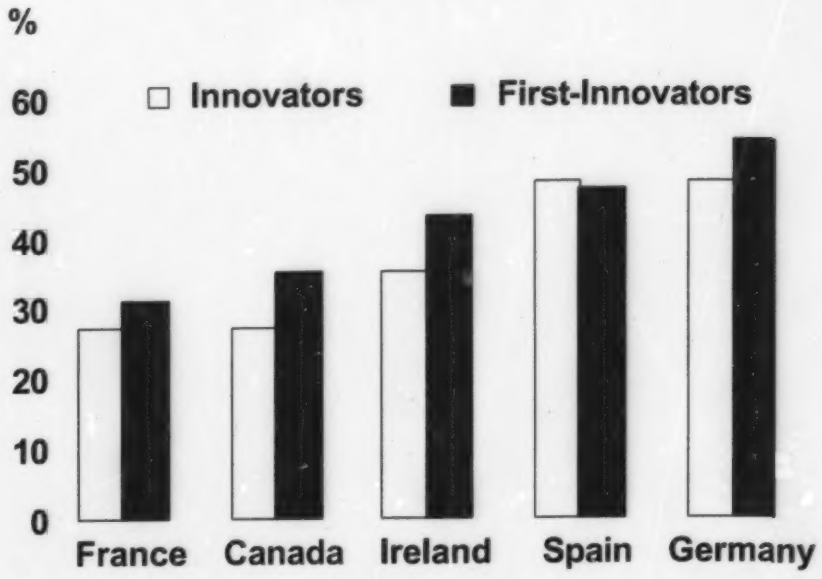
- **Challenge: Knowledge Performance**

Promote the creation, adoption, and commercialization of knowledge.

Canadian firms do not reap sufficient benefits from innovation…

- **80% of Canadian manufacturing companies are introducing new and improved products and services to the market.**
- **But Canadian firms trail in their ability to capture the economic benefits of innovation.**
  - **→Canadian innovations have a smaller overall impact on sales.**
  - **→Holds true for first innovations as well (world first or country first).**

Share of Sales from New or Improved Products

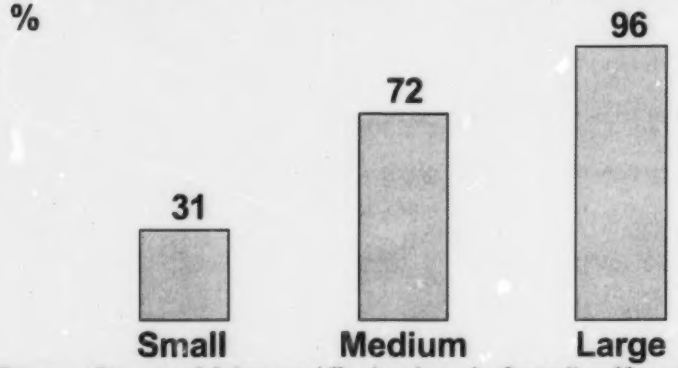


Source: Mohnen and Therrien (2001), How Innovative are Canadian Firms Compared to some European Firms? A Comparative Look at Innovation Surveys, Merit Research Memorandum, 2001-033, Maastricht

...and they are slow to adopt leading-edge innovations

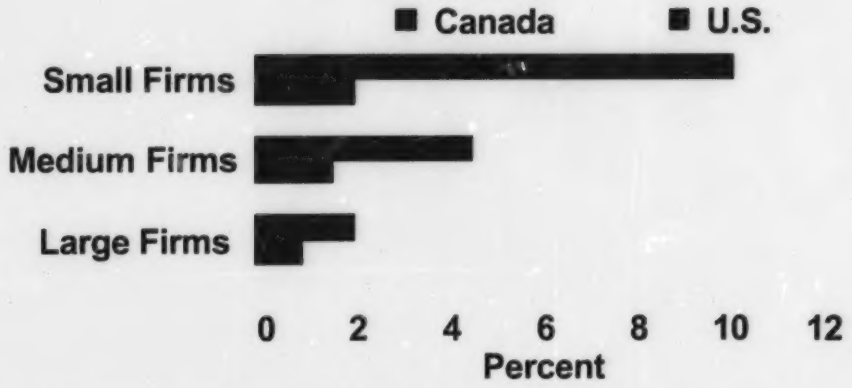
- **There is a significant variation in advanced technological use, with particular challenges for:**
  - **→Small business**
  - **→Canadian-owned firms**
- **Canadian firms of all sizes are also considerably behind their U.S. counterparts in adopting the technologies and implementing the business practices required to take advantage of electronic commerce market opportunities.**

Canadian Manufacturing Firms Using More Than Five Advanced Technologies, 1998



Source: Survey of Advanced Technology in Canadian Manufacturing, 1998

E-Commerce Sales as Percentage of Total Sales, 2000



Source: *Canada: The State of E-Business when Compared to the US*, Special Report for the Canadian E-Business Opportunities Roundtable, IDC Canada, 2001

Research and Development Performance

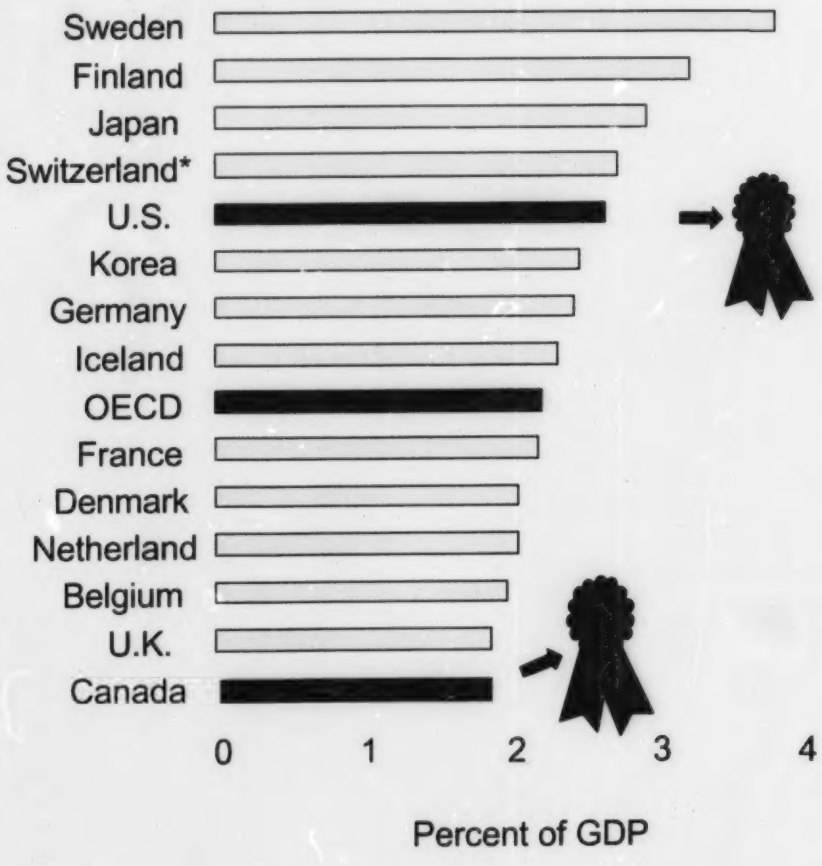
- **We currently rank 14th in R&D performance among OECD countries. We need to continue focussing on increasing our R&D performance in all sectors of the economy.**

- **Private Sector:**
  - → **57% of Canada's R&D**
  - → **Fastest pace of growth in G-7**
  - → **But ranks only 15th in OECD**
  - → **Challenges: industrial structure, firm size, foreign ownership, concentration**

- **Universities:**
  - → **31% of Canada's R&D**
  - → **Strong ties to private sector**
  - → **Challenges: faculty retirements, indirect research costs, small university research specialization, commercialization, supply of HQP**

- **Governments:**
  - → **11% of Canada's R&D**
  - → **Key to delivering on stewardship responsibilities and promoting innovation**
  - → **Challenges: researcher retirements, keeping pace with scientific developments**

R&D Intensity in the OECD Area, 1999 or Most Recent Year



*1996
Source: OECD Main Science and Technology Indicators 2001/2

Addressing the Knowledge Performance Challenge

- **Universities**
  - → **Support a portion of indirect research costs for universities. (Budget 2001 takes first step with one-time investment)**
  - → **Provide internationally competitive research opportunities in Canada. (Budget 2001 increases granting councils' annual budgets)**
  - → **Leverage the commercialization potential of publicly funded academic research.**
- **Private Sector**
  - → **Provide greater incentives for the commercialization of world-first innovations.**
  - → **Reward Canadian innovators.**
  - → **Provide more incentives for small and medium-sized enterprises (SMEs) to adopt and develop leading-edge innovations.**
  - → **Increase the supply of venture capital in Canada.**
- **Government**
  - → **Renew the Government of Canada's science and technology capacity to respond to emerging public policy, stewardship and economic challenges and opportunities. (Budget 2001 provides additional funding for Government labs)**

- **Challenge: Skills**

Ensure the supply of people who create and use knowledge.

Skills Challenge

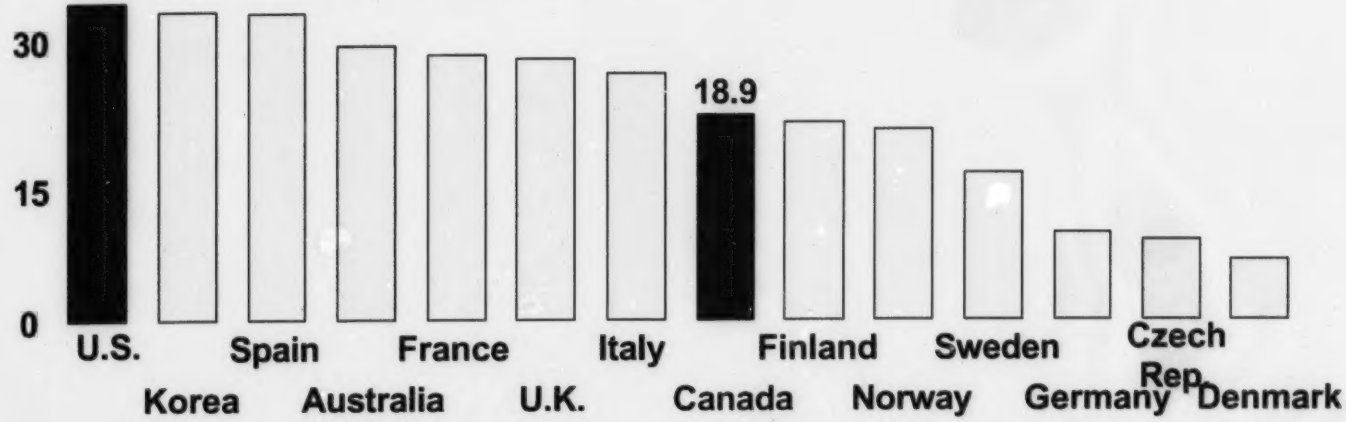
- **Innovation Paper: focus is on highly qualified people to fuel innovation.**
- **Skills and Learning Paper: focus is on helping all Canadians participate in the KBE.**
- **Canada has a highly educated workforce, but skill shortages are looming (global phenomenon).**
- **Three sources:**
  - → **New graduates**
  - → **Immigrants**
  - → **Current workforce**

New Graduates

- Over the past decade, full-time university enrolments (as a proportion of age cohorts) have been growing slowly, while part-time enrolments have sharply declined.
- We need to double the number of research scientists and engineers to meet our target of being one of the top 5 most innovative countries.
- But we need "world-class" managers too.
- Challenge: increase graduate enrolment and attract international students.

University-level Participation Rate Full-time and Part-time, 1998

Percentage of the Population 18 to 21



Source: OECD, Education Data Base, January 2001

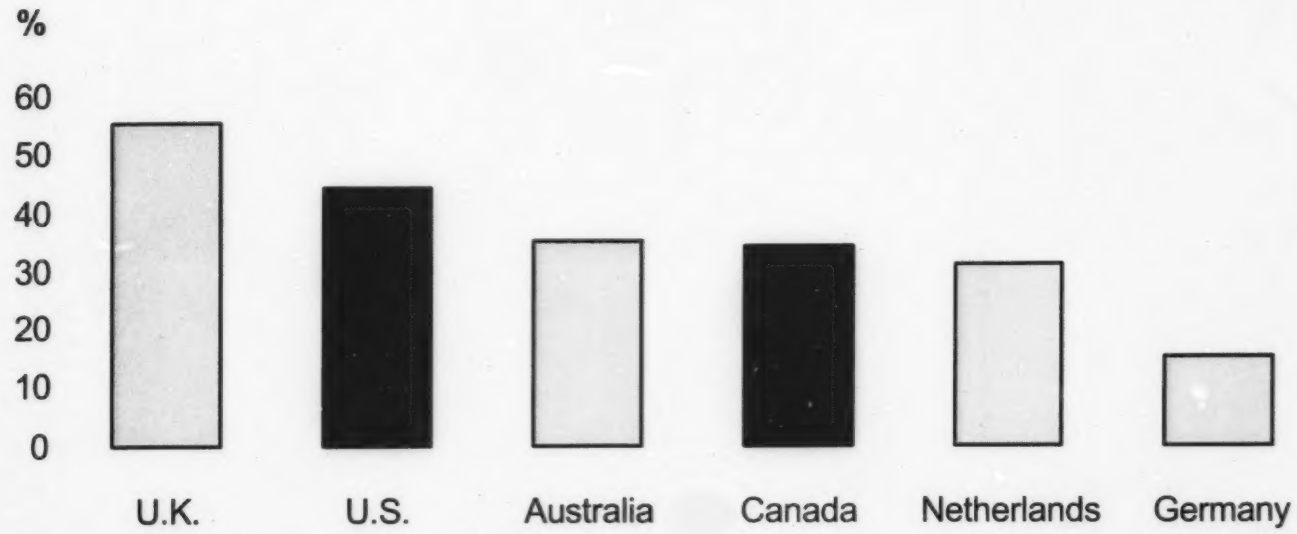
Immigration

- **Immigrants provide a valuable source of highly skilled labour to Canada.**
- **It is crucial to ensure that immigration system plays its role:**
  - **→Attracting talent to urban and rural areas**
  - **→Ensuring credentials are recognized**
  - **→Facilitating the entry of permanent and temporary skilled workers**
- **Challenge: continue to secure the highly qualified people needed to fuel the Canadian economy.**

Current Workforce

- **Most important source of supply.**
- **Skills upgrading is essential.**

Percentage of Employed Adults Aged 25-54 Participating in Employer Sponsored Formal Job-related Training, 1995



Source: OECD Employment Outlook, June 1999

Addressing the Skills Challenge

- **New Graduates:**
  - → **Grants/fellowships/scholarships for graduate students**
  - → **Create a world-class scholarship program**
  - → **Establish a work-oriented graduate fellowship program**
- **Canadian Immigration System:**
  - → **Attract and retain skilled immigrants**
  - → **Brand Canada as destination of choice**
- **Adult Labour Force**
  - → **Links to HRDC's Skills and Learning Agenda**

- **Challenge: Innovation Environment**

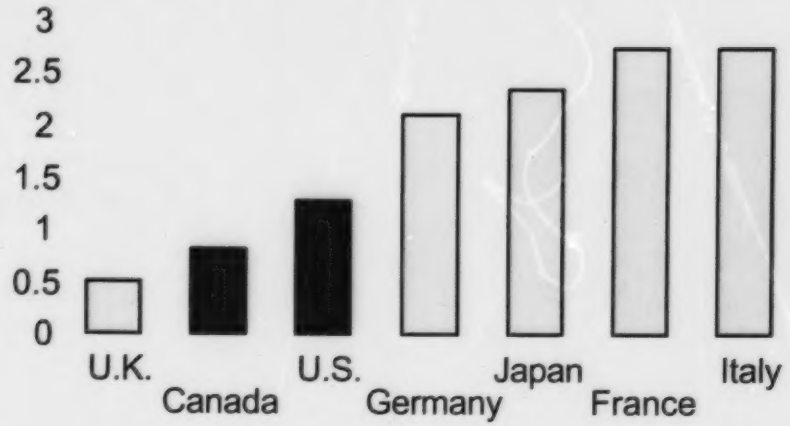
Build an environment of trust and confidence, where the public interest is protected and marketplace policies provide incentives to innovate.

Innovation Environment

- **Innovation environment is the climate created by government stewardship regimes that protect public interest and support innovation.**
- **A world-class innovation environment suffers no trade-off between the two.**
- **Canada's innovation environment is strong.**
  - → **Stewardship policies protect the public interest.**
  - → **Marketplace policies support innovation.**
- **Other countries are refining policies to position themselves on the global stage. Canada must keep pace.**

Regulatory Barriers to Entrepreneurship* 1998

Scale of Indicators, least to most restrictive



*Total of administrative burdens on start-ups, barriers to competition, regulatory & administrative opacity
Source: Summary Indicators of Product Market Regulation with an extension to Employment Legislation OECD (Econ. Dept Working Papers #226), 2000

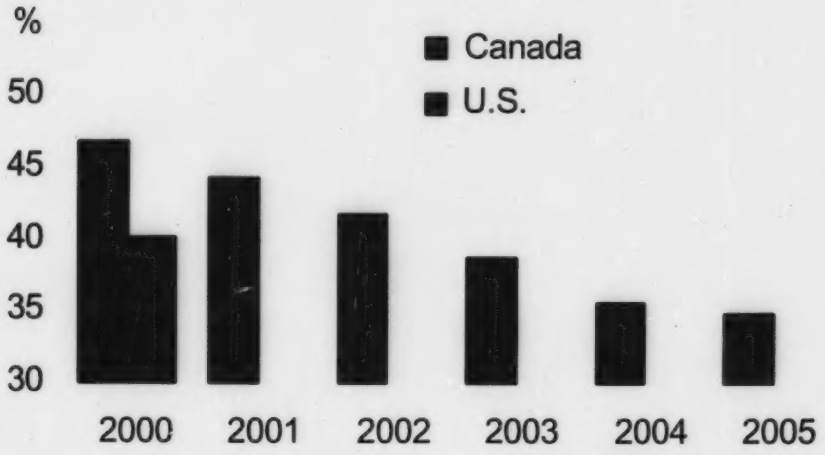
Stewardship: Protecting the Public Interest

- Canada has strong record in protecting public interest while promoting innovation.
- Need to be able to address challenges to stewardship capacity that emerge from new scientific developments.
- Challenge:
  - → Tap into expert advice on emerging issues
  - → Learn from other countries' experiences
  - → Where appropriate, develop shared approaches to common problems

Business Tax Regime

- **Canada will soon have one of the most competitive business tax regimes in the world, providing an incentive to invest in innovation.**
- **Recent changes to the tax treatment of stock options help to attract and retain leaders, researchers and other highly qualified people from Canada and abroad.**
- **Challenge: To maintain business tax advantages.**

Corporate Income and Capital Tax Rates in Canada and the U.S.

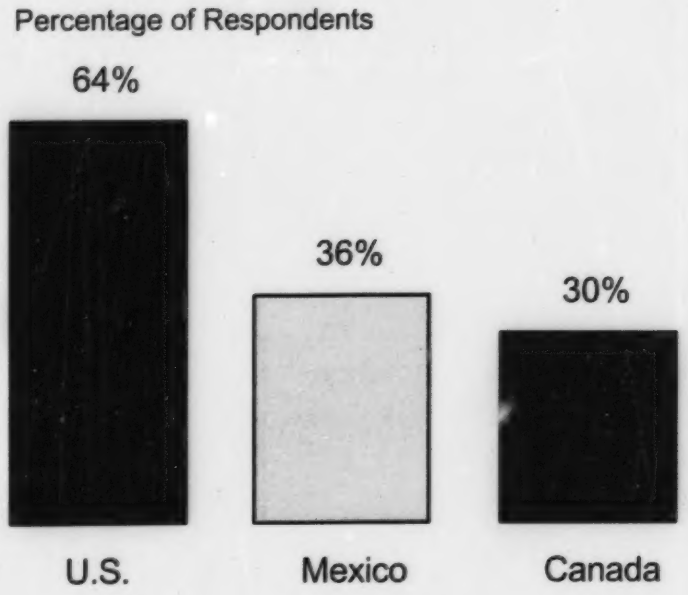


Note: Rates are based on changes announced to Dec. 2001. Rates include the income tax rate equivalent of capital taxes.
Source: Finance Canada, Budget 2001

Branding Canada to the World

- **Not only is it important to be innovative, we must be recognized as such.**
- **Canada is not always top of mind for many foreign investors.**
- **Challenge: to ensure that investors are aware of Canada's advantages.**

Investment Intentions of Major Multinational Firms



Source: AT Kearney, Global Business Council, FDI Confidence Index, June 1999, Volume 2, Issue 1

Addressing the Innovation Environment Challenge

- **Support a "Canadian Academies of Science": independent, expert assessments on sciences underlying pressing new issues and matters of public interest.**
- **Undertake systematic expert reviews of existing stewardship regimes through international benchmarking.**
- **Ensure Canada's business taxation regime remains internationally competitive.**
- **Brand Canada as a location of choice.**

Community Level Innovation

- **Sources of competitive advantage tend to be localized. The elements of the national innovation system come together in communities.**

- **Large Urban Centres:**

  - **→Innovation thrives in industrial clusters - internationally competitive growth centres.**

  - **→Common feature is one or more institutions devoted to R&D.**

  - **→Canada can do more to stimulate development of world-class clusters.**

- **More Innovative Communities:**

  - **→Smaller communities, rural & First Nations communities can all participate in & contribute to innovative economy.**

  - **→But many lack the networks, infrastructure, investment capital or shared vision to live up to their innovative potential.**

Supporting Community Level Innovation

- **Support the development of globally competitive industrial clusters. (Budget supports communities with funding for NRC innovation centres.)**

- **Strengthen the innovation performance of communities.**

  - **→Support smaller communities in developing and implementing innovation strategies.**

  - **→Work with partners to advance a private sector solution to further the deployment of broadband, particularly for rural and remote areas.**
    (Budget commits funding for CAP and SchoolNet)

A Call for Action

- Canada's goal, as stated in the 2001 *Speech from the Throne*, is to be recognized as one of the most innovative countries in the world.

- Innovation Paper represents broad-based governmental agreement on innovation strategy, outlines actions Government of Canada could take and challenges partners & stakeholders.

- Broad participation is essential for success.